

Slope: Part 1

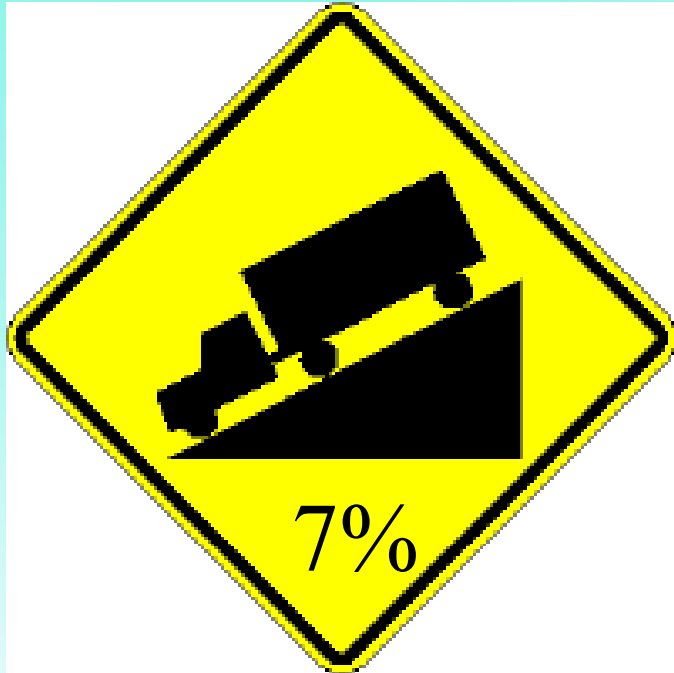
Finding the Slope of a Line

What is the meaning of this sign?

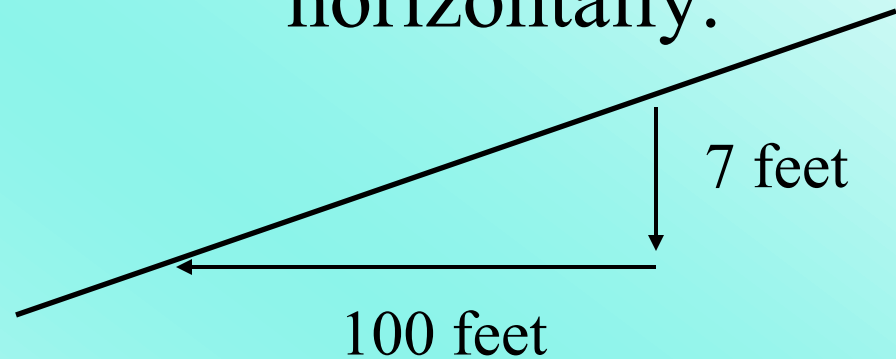


1. Icy Road Ahead
- ✓ 2. Steep Road Ahead
3. Curvy Road Ahead
4. Trucks Entering Highway Ahead

What does the 7% mean?



7% is the slope of the road.
It means the road drops 7 feet
vertically for every 100 feet
horizontally.

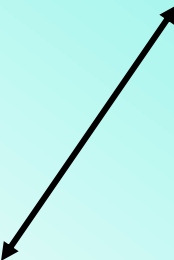


So, what is slope???


Slope is the steepness of a line.

Slope can be expressed different ways:

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{\textit{rise}}{\textit{run}} = \frac{\text{vertical change}}{\text{horizontal change}}$$

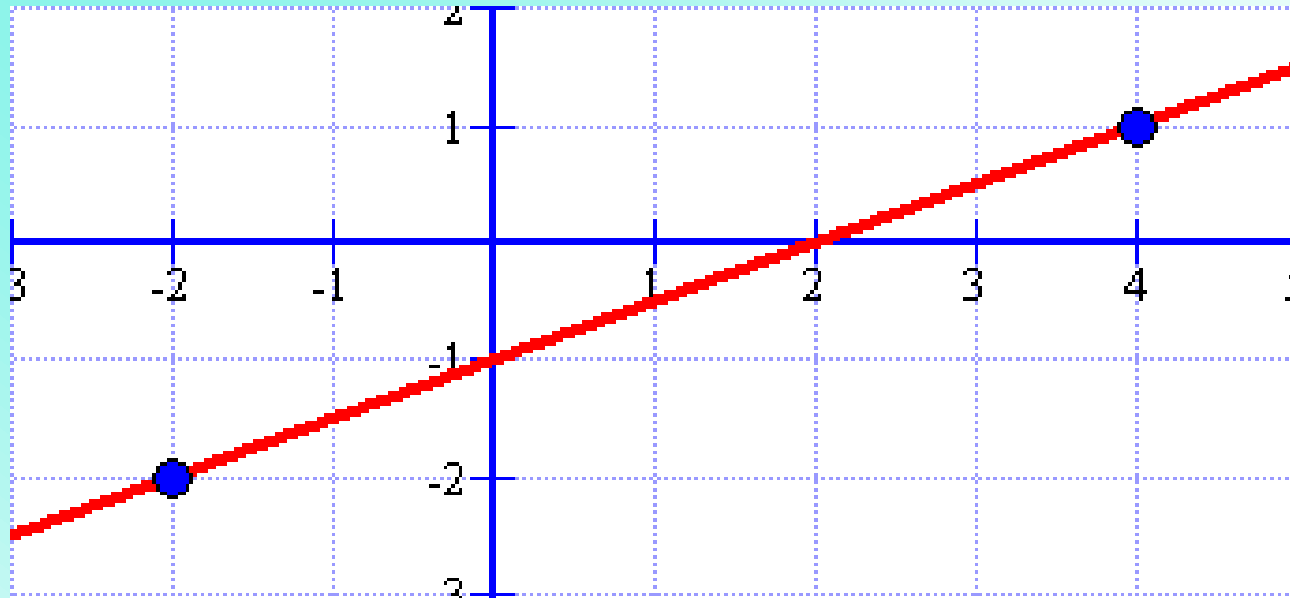


A line has a positive slope if it is going uphill from left to right.



A line has a negative slope if it is going downhill from left to right.

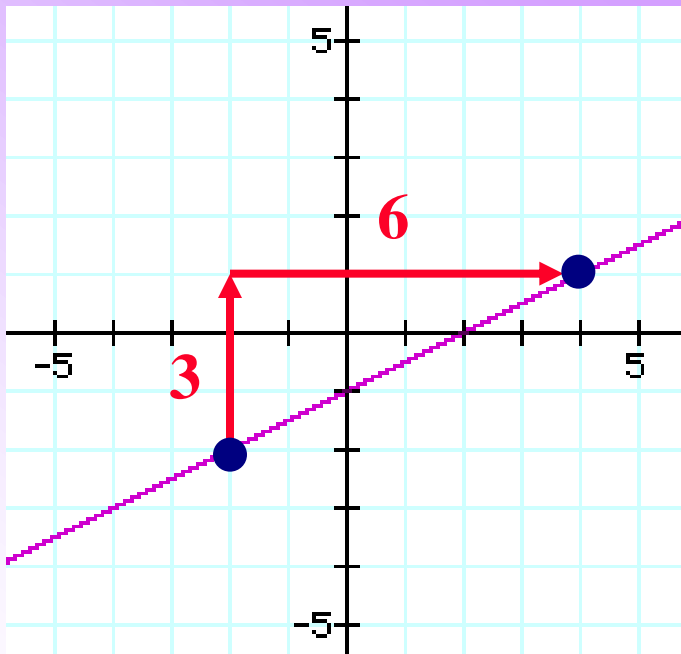
1) Determine the slope of the line.



When given the graph, it is easier to apply
“**rise over run**”.

Determine the slope of the line.

Start with the lower point and count how much you rise and run to get to the other point!



$$\frac{\text{rise}}{\text{run}} = \frac{3}{6} = \frac{1}{2}$$

Notice the slope is positive
AND the line increases!

2) Find the slope of the line that passes through the points $(-2, -2)$ and $(4, 1)$.

When given points, it is easier to use the formula!

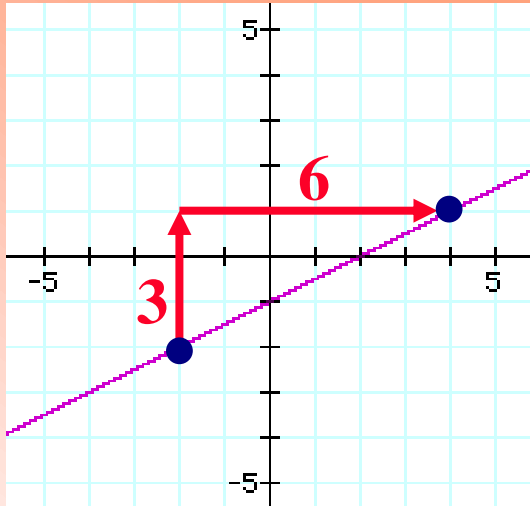
$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

y_2 is the y coordinate of the 2nd ordered pair ($y_2 = 1$)

y_1 is the y coordinate of the 1st ordered pair ($y_1 = -2$)

$$m = \frac{(1 - (-2))}{(4 - (-2))} = \frac{(1 + 2)}{(4 + 2)} = \frac{3}{6} = \frac{1}{2}$$

Did you notice that Example #1 and Example #2 were the same problem written differently?



$(-2, -2)$ and $(4, 1)$

$$\text{slope} = \frac{1}{2}$$

You can do the problems either way!
Which one do you think is easiest?

Find the slope of the line that passes through $(3, 5)$ and $(-1, 4)$.

1. 4

2. -4

 3. $\frac{1}{4}$

4. $-\frac{1}{4}$

3) Find the slope of the line that goes through the points $(-5, 3)$ and $(2, 1)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

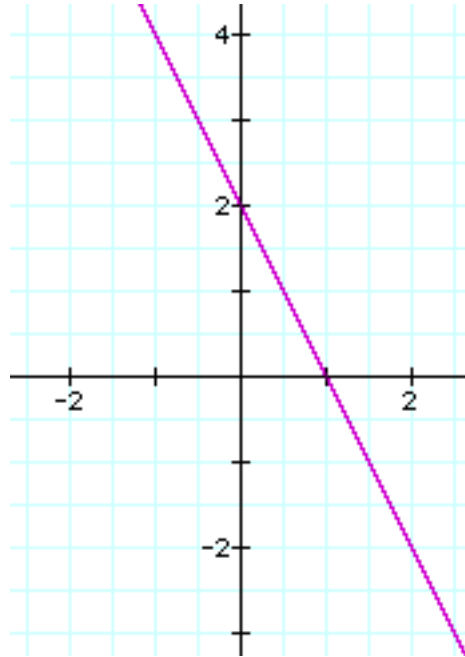
$$m = \frac{1 - 3}{2 - (-5)}$$

$$m = \frac{1 - 3}{2 + 5}$$

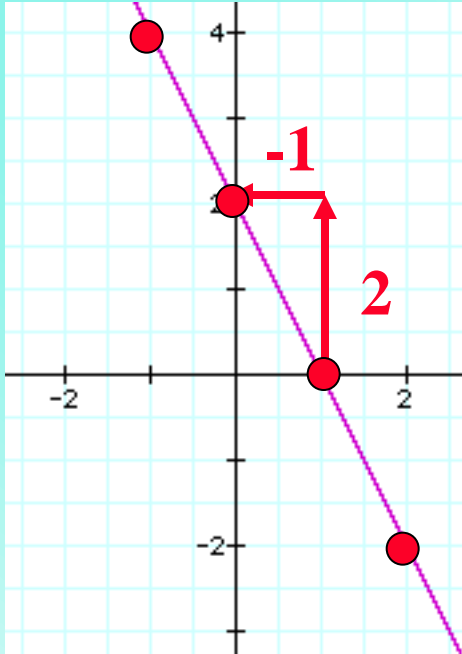
$$m = \frac{-2}{7}$$

Determine the slope of the line shown.

- ✓ 1. -2
- 2. $-\frac{1}{2}$
- 3. $\frac{1}{2}$
- 4. 2



Determine the slope of the line.

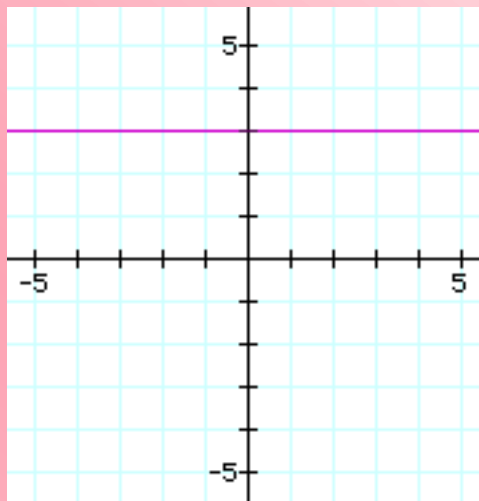


Find points on the graph.
Use two of them and
apply rise over run.

$$\frac{\text{rise}}{\text{run}} = \frac{2}{-1} = -2$$

The line is decreasing (slope is negative).

What is the slope of a horizontal line?

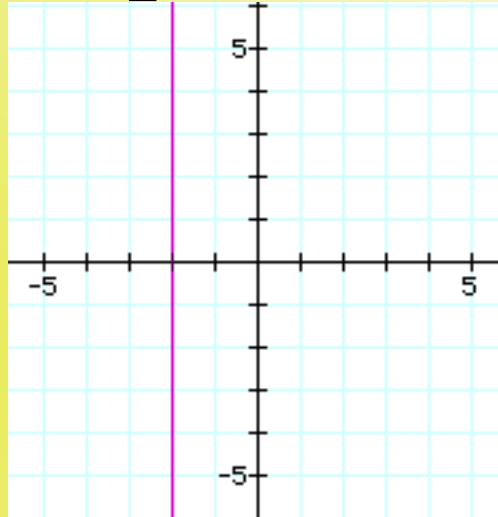


The line doesn't rise!

$$m = \frac{0}{\text{number}} = 0$$

All horizontal lines have a slope of 0.

What is the slope of a vertical line?



The line doesn't run!

$$m = \frac{\textit{number}}{0} = \textit{undefined}$$

All vertical lines have an undefined slope.

Remember the word “VUXHOY”

Vertical lines

Undefined slope

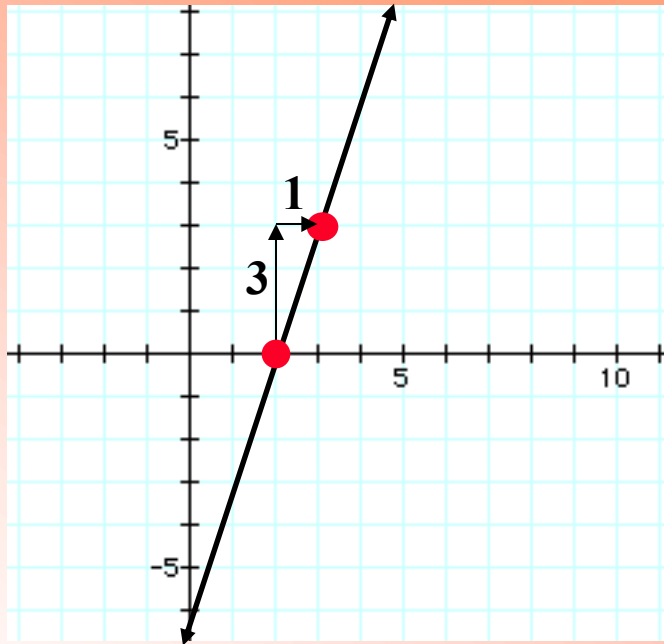
X = number; This is the equation of the line.

Horizontal lines

O - zero is the slope

Y = number; This is the equation of the line.

Draw a line through the point $(2,0)$ that has a slope of 3.



1. Graph the ordered pair $(2, 0)$.
2. From $(2, 0)$, apply rise over run (write 3 as a fraction).
3. Plot a point at this location.
4. Draw a straight line through the points.

The slope of a line that goes through the points $(r, 6)$ and $(4, 2)$ is 4. Find r .

To solve this, plug the given information into the formula

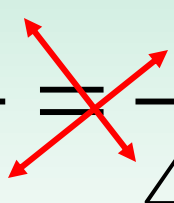
$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}.$$

$$4 = \frac{2 - 6}{4 - r}$$

To solve for r , simplify and write as a proportion.

$$4 = \frac{2-6}{4-r} \quad \Rightarrow \quad \frac{4}{1} = \frac{-4}{4-r}$$

Cross multiply.

$$\frac{4}{1} = \frac{-4}{4-r}$$


$$1(-4) = 4(4-r)$$

Simplify and solve the equation.

$$1(-4) = 4(4 - r)$$

$$-4 = 16 - 4r$$

$$\begin{array}{r} -16 \quad -16 \\ \hline \end{array}$$

$$\begin{array}{r} -20 = -4r \\ \hline \end{array}$$

$$\begin{array}{r} -4 \quad -4 \\ \hline \end{array}$$

$$5 = r$$

The ordered pairs are (5, 6) and (4, 2)